APPLE

Challenge Math

Teacher's Guide

CHALLENGE MATH 14992
SUNBURST DISK 510 C
Discard

SUNBURST
COMMUNICATIONS

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CHALLENGE MATH
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INTRODUCTION

Challenge Math is a set of three computer programs designed to give students practice in basic mathematical operations: addition, subtraction, multiplication, and division.

The three programs, ALIEN INTRUDER, DIGITOSAURUS, and MATH MANSION, utilize the computer's ability to randomly generate numbers and problems. This allows the program to be used repeatedly by the same student or group of students.

One of the main difficulties with drill and practice in basic mathematical operations is that of keeping students interested and motivated. The game format and imaginative use of sound and color graphics provide an excellent solution to this dilemma.

The Teacher Option allows certain features of ALIEN INTRUDER and DIGITOSAURUS to be preset, allowing the teacher to structure the programs to suit the special needs of individual students or groups of students. The Teacher Option allows control of level of difficulty, use of sound, choice of mathematical operation, and, in the case of ALIEN INTRUDER, the use of decimals rather than whole numbers, selection of speed, and number of problems.

ALIEN INTRUDER is an action game demanding quick recall of basic number facts. The student must find the right answer before it is eaten by an alien.

DIGITOSAURUS requires the student to judge which of three problems will give the largest answer and then to type in the answer to that problem. The correct answers age a Digitosaurus. The student's goal is to help the Digitosaurus grow as old and, therefore, as wise as possible.

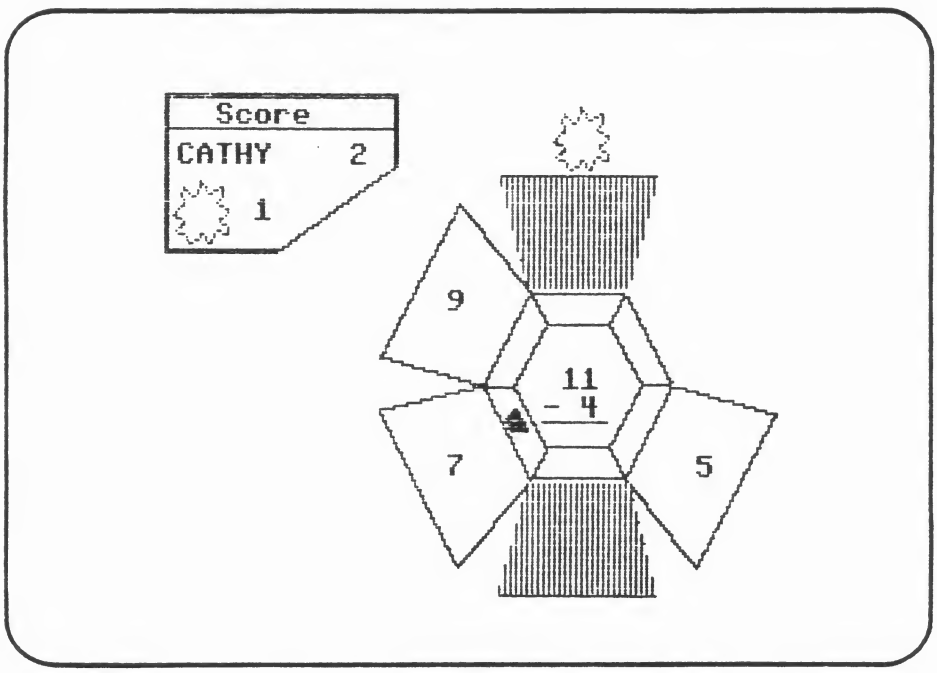
MATH MANSION asks students to work backwards to construct a problem that will produce a given answer.

The programs are designed for a 48K Apple II with disk drive. If you need assistance in operating your computer, check the sections of this Teacher's Guide entitled "Apple II Plus: Working with the Computer" and "What Happens If...?" or call Sunburst Communications toll-free at (800) 431-1934.

MATHEMATICAL SKILLS NEEDED

	ALIEN INTRUDER	DIGITOSAURUS	MATH MANSION
WHOLE NUMBER			
Addition			
1-digit number added to 1-digit number.	X	X	
2-digit number plus a 2-digit number.		X	
find an addend, given the addend and the sum.			X
Subtraction			
1-digit number subtracted from a 1-digit number.		X	
1-digit number subtracted from 1- or 2-digit number.	X	X	
1- or 2-digit number subtracted from a 2-digit number.		X	
find a missing term, given two other terms in the problem.			X
Multiplication			
1-digit number (1 to 5) times a 1-digit number (1 to 5).		X	
1-digit number times a 1-digit number (1 to 10).	X	X	
2-digit number times a 1-digit number.		X	
find a factor, given another factor and the product.			X
Division			
2-digit number divided by a number from 1 - 5.		X	
2-digit number divided by a 1-digit number.	X	X	
3-digit number divided by a 1-digit number.		X	
find a missing term, given the answer and the other term.			X
DECIMALS			
Addition			
1-digit whole number or decimal added to 1-digit decimal.	X		
Subtraction			
1-digit decimal subtracted from 1- or 2-digit decimal.	X		
Multiplication			
1-digit decimal multiplied by 1-digit decimal or whole number.	X		

ALIEN INTRUDER



Skills: addition, subtraction, multiplication, and division using whole numbers. (Teacher Option allows addition, subtraction and multiplication using decimals.)

Grade Level: 1 - 6

Reading Level: not applicable

Time Required: 5 minutes

Objectives:

1. to gain practice performing basic mathematical operations with whole numbers.
2. to gain practice performing basic mathematical operations with decimals (Teacher Option).
3. to develop speed in recall of basic mathematical facts.

ALIEN INTRUDER

Program Description

This learning game develops quick recall of basic math facts together with eye and hand coordination. The object of this program is to starve off an "alien intruder" who gains energy by eating numbers. The students, in order to save their planetary home base, must outwit the alien with correct answers.

The alien intruder races around the outside of the student's home base. Each wing of the spaceship contains a possible answer to the problem displayed in the center of the ship. At the base of one wing is a pointer controlled by the ← and → keys of the computer. The student must move the pointer to the correct answer to the problem and press RETURN or the SPACE BAR. This must be done before the alien lands on the wing and eats both the number and the wing.

If the student gets the pointer aimed at the correct answer and presses RETURN before the alien gets there, the wing fills in with color and the student scores a victory. The game continues until all the wings of the spaceship have been played (either saved or lost). The computer then asks the student if he or she would like to try again.

ALIEN INTRUDER has been initially set to perform the following:

- whole numbers
- student choice of type of problem (addition, subtraction, multiplication, division)
- student choice of number of problems
- moderate speed
- sound effects

If you would like to modify any of the program features, ALIEN INTRUDER has a Teacher Option which allows you to make program changes.

Teacher Option

To get into the Teacher Option:

Remove the write protection sticker on your disk. Insert the diskette, turn on the Apple II and the monitor, and let the menu program load. When the main menu appears, hold the Control (CTRL) key down and press T. The Teacher Option Menu should now appear on your screen. The following choices will appear:

1) ALIEN INTRUDER
2) DIGITOSAURUS
3) RETURN TO MAIN MENU

To use the ALIEN INTRUDER Teacher Option, type in 1 and press RETURN. Then follow the instructions on your screen to select the options you want to set for the program.

ALIEN INTRUDER

Five Features of Teacher Option:

1) Type of Problem. You may set the program to present either 1) whole numbers or 2) decimals. (See the chart below for the types of problems presented in whole numbers or decimals.

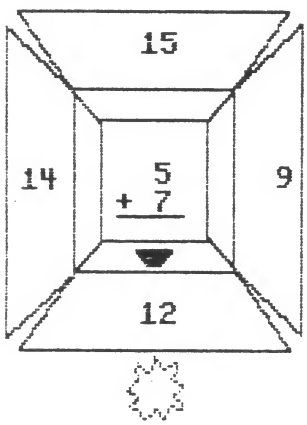
2) Mathematical Operation. You may set the program to present either 1) addition, 2) subtraction, 3) multiplication, 4) division, or 5) you may let the student choose the operation.

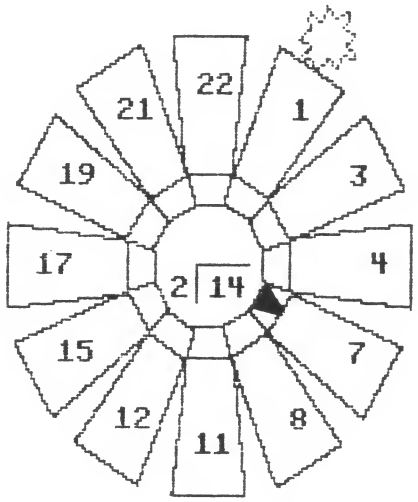
The chart below shows the different options you have in working with the features discussed above:

Operation	Type of Problem	Sample Problem
Whole Number Addition	a 1-digit number added to a 1-digit number.	5 +4
Whole Number Subtraction	a 1-digit number subtracted from a 1- or 2-digit number.	12 -7
Whole Number Multiplication	a 1-digit number multiplied by a 1-digit number.	5 x4
Whole Number Division	a 1-digit number divided into a 1- or 2-digit number.	2/16
Decimal Addition	a 1-digit whole number added to 1-digit decimal number; a 1-digit decimal number added to another 1-digit decimal number.	4.0 +.8
Decimal Subtraction	a 1-digit decimal number subtracted from a 1- or 2-digit decimal number; a 1-digit decimal number subtracted from a 1-digit whole number.	4.7 -.7
Decimal Multiplication	a 1-digit decimal number multiplied by another 1-digit decimal number; a 1-digit decimal number multiplied by a 1-digit whole number.	.4 x.3

3) Number of Problems. The student's spaceship can have a varying number of wings attached. Each wing contains a possible answer to the problem listed in the center of the spaceship. The number of wings corresponds to the number of problems to be presented. In other words, if you have a spaceship with six wings, there will be six problems presented with the correct answer located in one of the wings each time a new problem is presented.

When working with decimals, you may set from 5 to 10 possible problems (making 5 to 10 wings) or you can let the student decide. For whole numbers, you can set from 4 to 12 possible problems or let the student select. There is no correlation between the possible answers from which to choose and the difficulty level; this will vary with each student.





4) Speed. There are five speed settings available for ALIEN INTRUDER. The speed selected is the average time span before the alien can attack the answer.

- Very slow (17 seconds)
- Moderately slow (14 seconds)
- Moderate (10 seconds)
- Moderately fast (7 seconds)
- Very fast (5 seconds)

5) Sound. ALIEN INTRUDER is designed for optional use of sound. Depending upon your circumstances, you may wish to eliminate the sound.

ALIEN INTRUDER

How To Use Teacher Option:

Follow the instructions on your screen to select the options you want to set for the program. After you have made your choices, all the options you have set will be listed. You will then be asked if you wish to change any of the settings.

If yes, then you will be returned to the beginning of the ALIEN INTRUDER options so you may go through the choices again.

If no, you will be returned to the Teacher Option Menu where you may choose the Teacher Option for another program (DIGITOSAURUS) or return to the Main Menu.

If you use the Teacher Option, the choice you make will remain in effect until the Teacher Option is used again.

ALIEN INTRUDER

Classroom Use:

To play ALIEN INTRUDER successfully, students should know basic math facts, including addition, subtraction, multiplication and division of whole numbers; and addition, subtraction and multiplication of decimals.

You may want to give the students brief instructions before they begin the program. However, most students will be able to figure the program out by following the graphic instructions presented at the beginning of the program.

Because of the varying speed levels, this program is ideal for students working individually, in a self-paced environment. Once the students are familiar with the instructions, the program is also excellent for use as a competitive game between individual students or teams. A Student Record Sheet is available for students to keep track of their scores and their progress.

STUDENT RECORD SHEET

CHALLENGE MATH: ALIEN INTRUDER

Student's Name _____

Class _____ Date _____

S C O R E

Circle one: + - x ÷

I scored _____ out of _____.

The Alien got _____.

S C O R E

Circle one: + - x ÷

I scored _____ out of _____.

The Alien got _____.

S C O R E

Circle one: + - x ÷

I scored _____ out of _____.

The Alien got _____.

S C O R E

Circle one: + - x ÷

I scored _____ out of _____.

The Alien got _____.

S C O R E

Circle one: + - x ÷

I scored _____ out of _____.

The Alien got _____.

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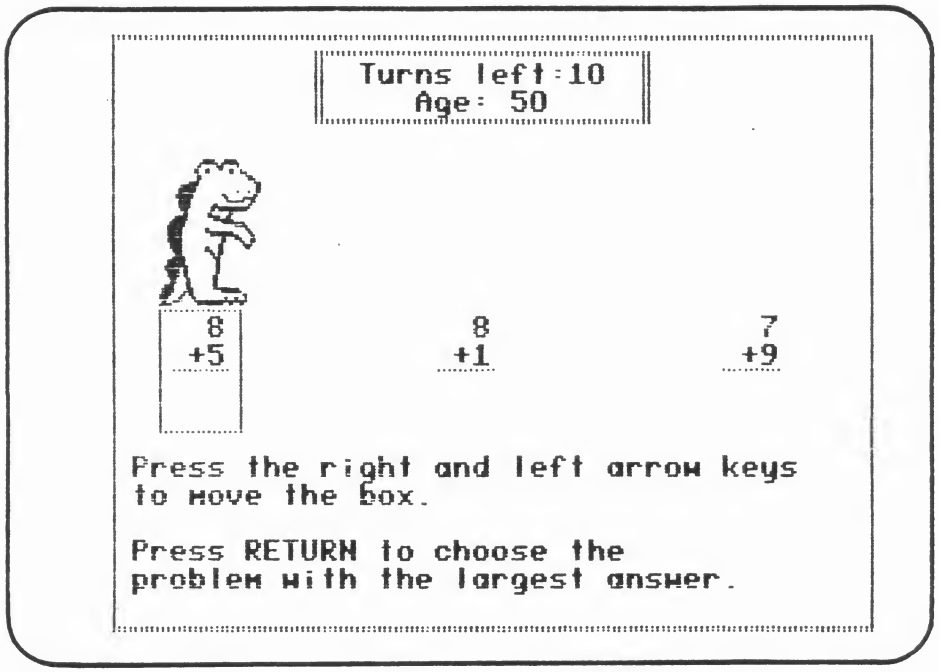


Skills: addition, subtraction, multiplication, division, and estimation using whole numbers.

Grade Level: 2 - 6

Reading Level: 2.8 (Spache)

Time Required: 5 minutes

Objectives:

1. to gain practice performing basic mathematical operations with whole numbers.

2. to gain practice estimating by choosing which of three problems will give the largest answer.

DIGITOSAURUS

Program Description:

Students are presented with the task of aging a Digitosaurus, a dinosaur-like creature who likes to get old because "older" means "wiser." The Digitosaurus grows olders and wiser as the students answer math problems correctly.

The students are first asked to give their friend, the Digitosaurus, a name. Then three problems are presented on the screen. The students must estimate which problem has the largest answer and move the Digitosaurus to the desired problem by pressing the ← and → keys of the computer and then pressing RETURN. The next step is to answer the problem. The students get two tries.

Scoring. A scoreboard appears at the top of the screen which tallies the Digitosaurus's age and the number of turns the students have left. Students begin the game with 10 chances to help the Digitosaurus grow old.

The score is determined as follows:
50 years - if the answer is largest and students get it correct on the first try.
40 years - if the answer is largest and students get it correct on the second try.
35 years - if the answer is in the middle and students get it correct on the first try.
25 years - if the answer is in the middle and students get it correct on the second try.
0 years - if the answer students choose is the smallest possible answer.

If the students don't solve the problem correctly, the Digitosaurus does not age. The Digitosaurus then gives the correct answer and a new set of problems appear. At the end of 10 tries, the students may enter the Digitosaurus Hall of Fame. The students and their Digitosaurus are entered along with their score. The Hall of Fame holds up to 10 names. If more students' names are added, the lowest scorer is eliminated to make room for the new member. There are four Halls of Fame, one for each mathematics operation. An option is included in the Teacher Option which allows you to erase the scores.

DIGITOSAURUS has been initially set to perform the following:

- student choice of type of problem
- student choice of level of difficulty

If you would like to modify any of the program features, DIGITOSAURUS has a Teacher Option which allows you to make program changes.

DIGITOSAURUS

Teacher Option:

To get into the Teacher Option: Remove the write protection sticker on your disk. Insert the diskette, turn on the Apple II and the monitor, and let the menu program load. When the main menu appears, hold the CONTROL key down and press T. The Teacher Option Menu should now appear on your screen. The following choices will appear:

1) ALIEN INTRUDER
2) DIGITOSAURUS
3) RETURN TO MAIN MENU

To use the DIGITOSAURUS Teacher Option, type in 2 and press RETURN. Then follow the instructions on your screen to select the options you want to set for the program.

Three features of Teacher Option:

1) Mathematical Operation. All DIGITOSAURUS problems deal with whole numbers. The type of problem may be set with the Teacher Option. You may select 1) addition, 2) subtraction, 3) multiplication, 4) division, or 5) you may let the students choose the operation.

2) Difficulty level. You may set the program to present three levels of difficulty or you can let the students choose the difficulty level. (See chart on next page.)

DIGITOSAURUS

Difficulty Level	Type of Problem	Sample Problem
Easy	addition of a 1-digit number plus a 1-digit number;	2 +3
	subtraction of a 1-digit number from a 1-digit number;	9 -7
	multiplication of two 1-digit numbers (1 to 5);	2 x3
	division of a 2-digit number by a number from 1 to 5 with a possible answer from 1 to 9.	4/36
Medium	addition of 2 numbers from 0 to 20;	7 +9
	subtraction of a 1-digit number from a 2-digit number;	15 -7
	multiplication of a 1-digit number times a 1-digit number;	10 x8
	division of a 1- or 2-digit number by a 1-digit number with the answer being a 1-digit number.	9/81
Difficult	addition of 2-digit numbers plus a 2-digit number;	23 +45
	subtraction of a 1- or 2-digit number from a 2-digit number;	38 -17
	multiplication of a 2-digit number by a 1-digit number;	22 x4
	division of a 3-digit number by a 1-digit number with the answer a 2-digit number.	9/819
Student choice of level of difficulty		

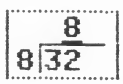
3) Erase the Scores. The computer will ask if you want to erase the students' scores. If you answer "Yes," you can then choose to erase the addition scores, subtraction scores, multiplication scores, division scores, or all scores.

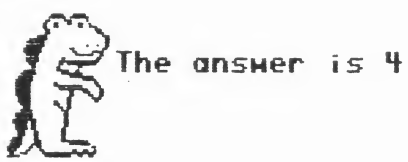
How to use the Teacher Option: Follow the instructions on your screen to select the options you want to set for the program. After you have made your choices, all the options you have set will be listed. You will then be asked if you wish to change any of the settings.

If yes, you will return to the beginning of the DIGITOSAURUS options so you may go through the choices again.

If no, you will be returned to the Teacher Option Menu where you may choose the Teacher Option for another program (ALIEN INTRUDER) or return to the Main Menu.

If you use the Teacher Option, the choice you make will remain in effect until the Teacher Option is used again.





DIGITOSAURUS

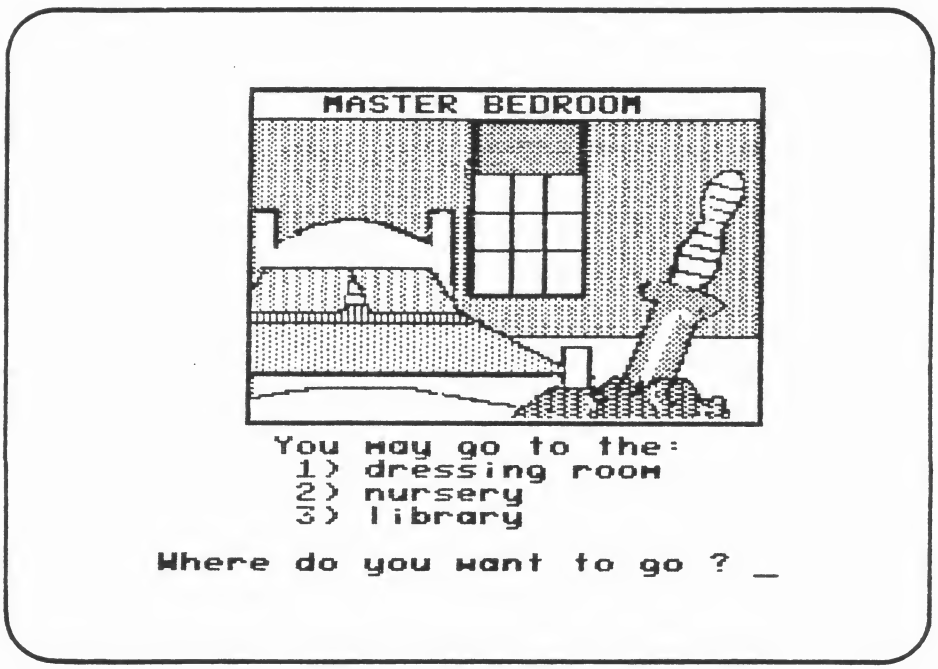
Classroom Use

To play DIGITOSAURUS successfully, students should know basic math facts, including addition, subtraction, multiplication and division of whole numbers. Some practice in estimating would also be helpful, but not essential.

You may want to give the students brief instructions before they begin the program. However, most students will be able to figure the program out by following the instructions presented at the beginning of the program.

Because of the varying difficulty levels, this program is ideal for students working individually, in a self-paced environment. Once the students are familiar with the program, you may want to group them together. Involving a group of students tends to eliminate guessing because the interaction involved in making a group choice usually results in each student defending his or her opinion to the group.

MATH MANSION



Skills: addition, subtraction, multiplication, division

Grade Level: 3 - 8

Reading Level: 3.2 (Spache)

Time Required: 10 minutes

Objectives:

1. to gain practice performing basic mathematical operations with whole numbers.
2. to use higher level thinking skills in working backwards from an answer to a problem.
3. to become accustomed to situations where there is more than one possible correct answer.
4. to practice remembering sequence.
5. to establish a relationship between items by inventing the framework that relates the items.

MATH MANSION

Program Description:

What surprise does each room hold? A silver cup...or a ghost? In MATH MANSION, students must work their way through a labyrinth of rooms in a haunted mansion. The object of the game is to answer math problems correctly in order to find their way through the mansion and collect "possessions" needed to escape. In some rooms there are either:

1) aids to escape (candle, sword, rope, sledgehammer, axe, silver cup),
2) obstacles (bats, monster, ghost, a brick wall, broken door, booby trap).

Before students can enter a room, they must create a problem which will produce a given answer. For example: 5 __ __ = 25. Students can choose which operation they will use to solve the problem. In this problem, students could have answered 5 x 5 = 25 or 5 + 20 = 25. If they answer incorrectly, they may either try another problem to enter a different room, or, if there is only one room to enter, they must continue answering problems until they get one correct.

Once the room is entered, there are several events that could occur:

1) Aids to escape - Students may decide whether or not they want the possession. If they don't, they may opt for another room. (However, students must remember that they need certain "good" possessions to help them escape forthcoming obstacles.) If they want the possession, they must answer the problem correctly to acquire it. If the problem is answered incorrectly, they can either go on to another room or continue answering problems until they get one correct.

2) Obstacles - When faced with impending disaster, students may continue only if they have the "good" possession needed to deter the obstacle. Otherwise, they will be sent back to retrieve the possession or to take another route. For example, to pass through the room with the bats, the students need a candle to scare away the bats. If they don't have it, they can go back to the appropriate room and get it if they wish to go through the room with the bats.

In addition to the fun and challenge of entering rooms and figuring out solutions to problems, there is another element of intrigue to the game: Students will learn to recognize which possessions will be needed in order to escape via a particular route.

MATH MANSION

Classroom Use:

This game is excellent for students who need to work without pressure; there is no time limit and the students can continue trying different options until they get a correct solution. Since there is more than one "right" answer, students have the opportunity to exercise higher level thinking skills while reinforcing basic skills in mathematics: addition, subtraction, multiplication and division of whole numbers. Students keep working problems until they have found a way out of the haunted house. This will motivate students who need work on math problems to do more.

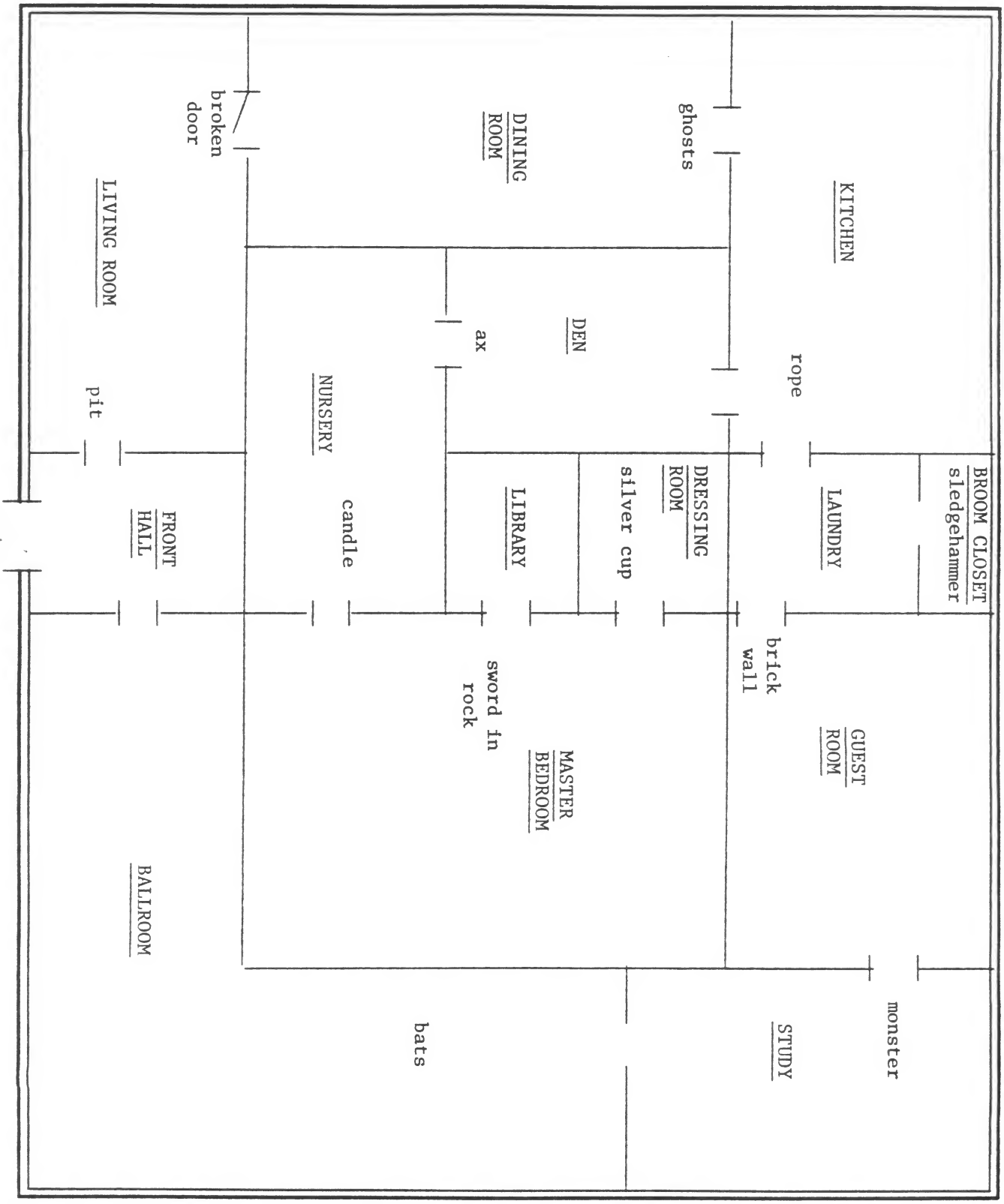
Although instructions are presented at the beginning of the program, you may want to go over the object of the game with the students before they begin. You'll need to explain the worksheet included, which is used to keep track of what possessions are found in each room. Unless students can remember this, they will need to write it down so they can refer to it if they have to go back to a door to retrieve a needed object.

Use of the Floorplan in this Teacher's Guide is optional. You may or may not wish to give this aid to your students, depending upon their ability level. For example, younger students might find it a necessary tool in order to play the game. However, you may want gifted or older students to try to figure out the floorplan mentally--where the rooms are and what possessions they hold. One suggested project could be to have these students turn in a floorplan which they have drawn themselves after completing the game. If you choose to have your students draw a floorplan, keep in mind that the floorplan they come up with might (and probably will) differ from the one included here. This does not necessarily mean it is incorrect. Because they are mentally estimating room size and they can place the first room in any location, there will be many floorplans possible.

Once the students are familiar with the program, MATH MANSION is good for use as a competitive game between individual students or teams. The student or group who answers the fewest number of problems to escape the mansion wins.

CHALLENGE MATH

MATH MANSION FLOORPLAN



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APPLE II PLUS: WORKING WITH THE COMPUTER

1. Turn on the television or monitor.

2. Insert the diskette into the disk drive with the label facing up and on the right.

3. Close the door to the disk drive.

4. Turn on the Apple II. (The on-off switch is on the back left side of the computer.)

5. You will see a red light on the disk drive turn on. If the disk drive light does not turn off in about 10 seconds, turn the Apple off and make sure your diskette is placed correctly in the disk drive.

6. SUNBURST will appear on the screen with the diskette name.

Shutting Off the System

1. Remove the diskette from the disk drive and return it to its place of storage.

2. Turn off the Apple.

3. Turn off the television or monitor.

Disk 560 copy 2

"WHAT HAPPENS IF...?" -- SUNBURST COURSEWARE AND WARRANTY

(1) What happens if a program will not load or run?
Call us on our toll-free number and we will send you a new diskette.

(2) What if I find an error in the program?
We have thoroughly tested the programs that SUNBURST carries so we hope this does not happen. But if you find an error, please note what you did before the error occurred. Also if a message appears on the screen, please write the message down. Then fill out the evaluation form or call us with the information. We will correct the error and send you a new diskette.

(3) What happens if the courseware is accidentally destroyed?
SUNBURST has a lifetime guarantee on its courseware. Send us the product that was damaged and we will send you a new one.

(4) How do I stop a program in the middle to go on to something new?
Hold the Control (CTRL) button down and press the E key. If you want to use another diskette, select the END option on the menu.

(5) Can I copy this diskette?
The material on the diskette is copyrighted. You should not copy the diskette.